

PARSONS - PROJECT OF THE MONTH—DECEMBER 2006

Client:

State of Utah

Project Value:

\$260 million

Project Duration:

2000 – 2008

Services Provided:

Master Planning, Project Management/

Owner's Representative

Project Scope:

Seismic retrofit;

Restoration of historic ornamentation;

Modernization of electrical, mechanical, and plumbing systems;

Construction of a new campus central plant;

Construction of two annex buildings;

Construction of two underground parking structures;

Supplement surface parking;

Campus landscaping

Utah State Capitol

Seismic Retrofit and Restoration

Salt Lake City, Utah



The State of Utah's elegant Capitol building was dedicated in 1916. With a 165-foot-high rotunda, marble Corinthian and Ionic columns, and granite façade, the building is a cherished civic symbol and state historic landmark. In 1998, the State formally began plans to revitalize the building through a multi-phased renovation and restoration program that will ensure the safety of the building's occupants, improve its functional usefulness, and preserve its historical legacy.

The State hired 3D/International, which was subsequently acquired by Parsons, to manage the master planning and project definition process. As the project progressed, our role grew to project management. In this capacity, we represent the owner in working with architects and contractors in an effort to ensure work is completed on schedule, within budget, and as specified. Parsons also provides space planning and management services for furnishings in the Capitol, House, and Senate buildings.

One of the project's objectives is to improve seismic capacity while maintaining the Capitol building's historic appearance. Located in Salt Lake City, the building stands in an earthquake zone where seismic monitoring stations record more than 700 earthquakes each year. Studies indicate a ground-rupturing earthquake of approximately 6.7 or greater on the Richter scale occurs along the Salt Lake City region of the Wasatch Fault about once every 1,300 years, and geologists estimate that it has been 1,300 years since the last such earthquake.

Before work on the Capitol building could commence, two new structures were designed and built to house the state legislature and government offices during renovation. The new \$36.6 million, four-level East and West buildings were originally outlined as part of the initial architect's master plan for the 40-acre site, but they had never been built.

Parsons recommended several unique design-build measures to limit risk and ensure delivery of the new structures on schedule and within budget. We also infused a collaborative approach with contractors. Contracts for the construction manager on the East and West buildings and the Capitol building, as well as the project architect, were guaranteed-maximum-price or fixed-fee contracts that provided for the award of quarterly bonuses based on performance for safety, budget, quality, and relationships.

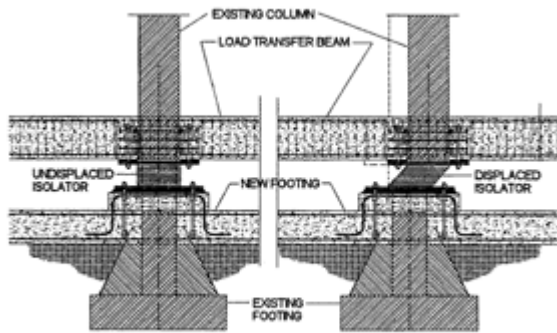
The process fosters a teamwork atmosphere and optimal communication among key participants. The teams working on the Capitol building have introduced a variety of modern solutions to bolster its structural integrity and seismic capacity while respecting its architectural aesthetics: A base isolation system will allow the building to move independently of the ground. The base isolators will absorb much of the horizontal force from an earthquake, thereby reducing potential stress on the building's structure and ornamentation.

A series of new concrete shear walls will be added to the building to provide stiffness, which will reduce potential movement in the structure and concentrate it within the isolators. The shear walls will be hidden in abandoned vent shafts, rotunda/dome support piers, and elevator and stair shafts to minimize visual impact.

During a seismic event, the combination of base isolation with new shear walls is expected to reduce potential force on the building to less than one fourth of its previous unreinforced impact.



The 240-mile-long Wasatch Fault is sectioned into 10 segments averaging 25 miles in length. Each segment can rupture independently.



Typical isolator configuration and behavior. Used by permission from Reaveley Engineers & Associates.



Base isolator suspended from the load transfer system. The load transfer system temporarily supports the building during installation of the isolators.

A system of electrical anodes is being installed throughout the dome structure to halt corrosion of the structural steel caused by years of water infiltration. The anodes will create a very low current that will alter the electrolytic cycle and halt further corrosion for 50 to 100 years. Repairing or replacing the steel would have cost far more since much of the steel is enveloped in concrete.

A new 6-inch reinforced wall has been added to the interior of the upper dome to strengthen the structure while protecting existing concrete and steel from deterioration.



A multi-tiered scaffold system allows teams of craftsmen to reach the Capitol Rotunda atrium skylight for repairs and painting.

Skylights, windows, and interior features are being restored and upgraded to maintain and reintroduce natural light deep within the building's core. When the Capitol building was designed, electric lighting was minimal and the architect used extensive design measures to infuse the

building with natural light. Over the years, many corridors that had functioned as light wells were converted to office space. These light wells are being reopened throughout the building. The new East and West extension buildings were sited to complete a quadrangle that was part of the original design for the Capitol complex but they were never built. Their construction provided an effective and cost-efficient solution to temporarily house the Legislature, the Governor's Office, and other Capitol offices during the renovation. They will be remodeled to accommodate needs for office and meeting space after the Capitol restoration is completed in 2007. A new stone terrace will connect the Capitol building to the quadrangle while covering the perimeter of the base isolation system and providing space for new mechanical systems. As with the East and West buildings, the stone terrace was part of the original design for the Capitol complex that had not been built. The renovation is also modernizing the heating/air conditioning, electrical, plumbing, fire suppression, and phone/data systems.



Decorative painting and gold leaf applied in the Supreme Court Chambers.



House of Representatives Chamber prior to restoration.

When renovations are complete, Utah's Capitol building should protect its occupants during earthquakes of up to 7.3 magnitude. And on a daily basis, occupants and visitors will enjoy modernized building systems and restored historic features. Parsons is proud to provide independent project oversight to the State of Utah as it ensures the Capitol building will be treasured for decades to come.